

20, wherein said organic solvent which is a base of said ceramic sol solution is acetic acid, dimethyl formamide, methoxyethanol, alcohols, or glycols.

35. The piezoelectric/electrostrictive film element in Claim 20, wherein the content of said ceramic sol solution is 1-500 parts by weight based on the weight of said ceramic oxide powder when the suspension of said ultrafine ceramic oxide powder and said ceramic sol solution are mixed.

36. The piezoelectric/electrostrictive film element in Claim 20, wherein the thickness of said piezoelectric/electrostrictive film element is 1-100 μm .

37. The piezoelectric/electrostrictive film element in Claim 36, wherein the thickness of said piezoelectric/electrostrictive film element is 5-30 μm .

38. The piezoelectric/electrostrictive film element in Claim 20, wherein said piezoelectric/electrostrictive film element is thermally thermaled at 150-300°C.

39. A piezoelectric/electrostrictive film produced by the steps of:

A) preparing ceramic oxide powder by a non-explosive oxidative-reductive combustion reaction at a low temperature of 100-500°C, said ceramic oxide powder having a grain size of 1 μm or less and including lead (Pb) and titanium (Ti) as its basic constituents;

B) preparing ceramic sol solution by using an organic solvent or water as a base, said ceramic sol solution having constituents which are identical or similar to those of said ceramic oxide powder;

C) preparing suspension by dispersing said ultrafine ceramic powder into an organic dispersive medium;

D) obtaining dispersive mixture by mixing said suspension with said ceramic sol solution;

E) producing the piezoelectric/electrostrictive film by dipping a substrate into said dispersive mixture, and then performing electrophoretic deposition; and

E) thermally treating said piezoelectric/electrostrictive film at a temperature of 100-600°C, thereby removing said solvent, said ceramic sol solution serving as a reaction medium on the surfaces of ceramic oxide powder so that said oxide powder are coupled together.

40. The piezoelectric/electrostrictive film element in Claim 39, wherein the method further comprises a step of thermally treating said ultrafine ceramic oxide powder at 700-900°C before D).

41. The piezoelectric/electrostrictive film element in Claim 39 or Claim 40, wherein the method further comprises a step of drying the piezoelectric/electrostrictive film between G) and H).

42. The piezoelectric/electrostrictive film element in Claim 41, wherein the piezoelectric/electrostrictive film is dried at 70-100°C.

43. The piezoelectric/electrostrictive film element in Claim 39, wherein the particle size of said ultrafine ceramic oxide powder is 0.01-0.1 μm .

44. The piezoelectric/electrostrictive film element in Claim 39, wherein said substrate is made of metal, resinous polymeric organic compound, or ceramics.

45. The piezoelectric/electrostrictive film element in Claim 44, wherein said metal is nickel or stainless steel.

46. The piezoelectric/electrostrictive film element in Claim 44, wherein said resinous polymeric organic compound is polyester, polyimide, or teflon-based resin.

47. The piezoelectric/electrostrictive film element in Claim 44, wherein said ceramic is alumina, zirconia, silicon, silicon carbide, silicon nitride, silicon dioxide, or glasses.

48. The piezoelectric/electrostrictive film element in Claim 39, wherein said ultrafine ceramic oxide includes lead (Pb), zirconium (Zr) and titanium (Ti).

49. The piezoelectric/electrostrictive film element in Claim 48, wherein said ultrafine ceramic oxide is PZT, PMN or their solid solution (PZT-PMN) complex oxide.

50. The piezoelectric/electrostrictive film element in Claim 49, wherein said ceramic oxide powder further includes one or more elements among nickel (Ni), lanthanum (La), barium (Ba), zinc (Zn), lithium (Li), cobalt (Co), cadmium (Cd), cerium (Ce), chromium (Cr), antimony (Sb), iron (Fe), yttrium (Y), tantalum (Ta), tungsten (W), strontium (Sr), calcium (Ca), bismuth (Bi), tin (Sn) and manganese (Mn).

51. The piezoelectric/electrostrictive film element in Claim 39, wherein said organic dispersion medium in which said ultrafine ceramic oxide is dispersed is alcohols or acetones.

52. The piezoelectric/electrostrictive film element in Claim 39, wherein the content of said organic dispersant is 1-500 ml per gram of the ultrafine ceramic oxide powder which is dispersed.